

Original research article

Developing future leaders in reproductive health through a scholarly concentration for medical students^{☆,☆☆}

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Abstract

Objectives: To evaluate the impact of a scholarly concentration for medical students, which aims to develop students' research, clinical and advocacy skills to promote women's reproductive health.

Study design: Scholarly concentration programs provide opportunities to engage in scholarship beyond the traditional medical school curriculum. Faculty from the Family Medicine and Obstetrics and Gynecology Departments at Brown University collaboratively developed the Scholarly Concentration in Women's Reproductive Health. Three to five students per class enroll and carry out a 3-year mentored research project, attend monthly seminars, write position papers on reproductive health controversies and complete clinical electives in reproductive health. Students are required to disseminate their work through conference presentations and/or peer-reviewed publications. The program evaluation included measures of scholarly productivity and qualitative analyses of interviews with students and mentors as well as written and verbal feedback from students.

Results: Ten students comprised the first 3 classes completing the program, producing 24 national presentations and 9 peer-reviewed publications. Reported program benefits included increased knowledge, scholarship skills and support for career development in reproductive health. Key factors facilitating these results were as follows: effective mentoring relationships, the community of practice that emerged through the monthly seminars and student independence in project work.

Conclusions: A scholarly concentration for medical students provides a unique platform to support the development of talented students as future leaders in women's reproductive health.

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1. Implications

A scholarly concentration emphasizing longitudinal mentoring relationships, a nurturing community of practice and independence in project work helped medical students develop research skills and nurtured values and interests that may promote academic careers in reproductive health. This model holds promise for producing future leaders in the field.

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2. Introduction

Reproductive health indicators in the United States such as rates of unintended pregnancy, adolescent pregnancy and abortion are consistently poor compared to other Western nations [1–4], indicating a pressing need to train future physician leaders to address disparities in reproductive health. Further exacerbating this problem is the lack of comprehensive reproductive health curricula in many US medical schools [5,6].

A growing number of medical schools offer scholarly concentrations (SCs), which allow students to engage in longitudinal, in-depth study outside the traditional medical curriculum, with close guidance from a faculty mentor. In 2007, the Alpert Medical School of Brown University created an SC program that now comprises 13 interdisciplinary concentrations [7]. Approximately one-third of entering

students elect to participate in an SC. Each is paired with a faculty mentor to develop a project, which often involves clinical or basic science research, but may focus on education, community engagement or advocacy. Students devote the summer between first and second year to full-time project work, which they present at a required poster session in year 2. The medical school protects 1 day per week during year 2 for continued project work, and students may use fourth-year electives to complete projects. A systematic review of the impact of SCs noted ways in which these experiences may influence students: by supporting in-depth study, promoting scholarship and research activities, and influencing career decisions, though long-term outcomes are unknown [8].

The Scholarly Concentration in Women’s Reproductive Health was developed collaboratively by faculty in family medicine and obstetrics and gynecology in response to the need for future leaders in reproductive health. Faculty directors recognized that physicians play essential roles in research to advance clinical care, education to train future reproductive health providers and advocacy to address reproductive health disparities. The national organization Medical Students for Choice successfully fosters reproductive health leadership among interested medical students primarily through advocacy [9]; the SC model offers an alternative pathway through scholarship. The program’s overarching goal is to develop future leaders in women’s reproductive health research, advocacy, education and clinical care through scholarship.

This paper describes the development and evaluation of the Women’s Reproductive Health SC, using qualitative methods to examine how participation in the concentration impacted students and what key factors influenced the outcomes.

3. Materials and methods

3.1. Educational activities

The central activity for students who elect to participate in this program is a scholarly project in women’s reproductive health that is accomplished in the context of a 3-year relationship with a faculty mentor. The concentration directors (a family physician and an obstetrician–gynecologist) assist first-year students to identify an appropriate mentor based on

the student’s goals and area of interest. Each student works with his/her mentor to develop a scholarly project proposal and an institutional review board application if needed. Students then submit project proposals to the concentration directors for approval and apply to the medical school for a stipend for full time work on the project during the summer after first year. Proposals are reviewed and ranked for funding preference by a panel of faculty that includes the concentration directors, and the majority of students receive funding. In addition, students attend a monthly women’s reproductive health seminar, held in the evening, with their co-concentrators and two faculty directors. Second-year students attend all seminars, and third- and fourth-year students also attend when their clinical schedules permit. This series includes six to eight faculty presentations on clinical or research topics, with emphasis on health disparities and vulnerable populations, such as low-income women, adolescents, women in developing countries, women with substance abuse or mental health issues, and incarcerated women. Many seminars include discussion of research methods and the presenters’ academic career development. In addition, second-year concentrators compose a 3000-word position paper or commentary focusing on a current controversy in reproductive health selected by the student. These papers are expected to be suitable for submission in a medical journal and we encourage (but do not require) students to submit them for publication. We devote several seminars each year to peer review, including presentation and group critique of project designs and position papers, as well as progress reports from all students. Finally, all concentrators must complete at least one clinical elective in reproductive health during third or fourth year. Successful completion of an SC is noted in the Dean’s letter for residency application and recognized at a special graduation ceremony. Fig. 1 shows the timeline of required activities for the concentration.

To earn credit for the SC, student projects must meet the criteria for scholarship and be disseminated via a national presentation or a peer-reviewed publication. Scholarship criteria include clear goals, adequate preparation, appropriate methods, significant results, effective presentation and reflective critique [10]. Fourth-year students submit a portfolio of work including a personal reflection on their experience and make a brief formal presentation for the



Fig. 1. Timeline of student activities.

student group and faculty mentors. The group of faculty mentors evaluates the project and presentation based on the above scholarship criteria and provides written feedback.

3.2. Program evaluation methods

Students’ national presentations and peer-reviewed publications were tracked semiannually. The directors of each concentration receive written student feedback collected annually by the medical school. A research assistant conducted semistructured interviews with graduating students from the first two classes enrolled in the concentration and their faculty mentors. These occurred after the completion of final presentations and student evaluations and were transcribed verbatim. The program evaluation was deemed exempt from oversight by the university’s institutional review board. All participants provided written informed consent for interviews.

Two members of the research team used qualitative methods (template analysis) [11] to analyze all textual data, including written annual feedback from students, student and mentor interview transcripts, and personal statements from graduating student portfolios. We developed the initial template from the Kirkpatrick model for evaluating educational programs, which categorizes potential program impacts into four levels (see Table 1) [12]. The researchers independently read all documents to identify major themes, and in a series of four two-hour meetings, the researchers

added subcategories to the template based on these themes, reaching consensus on themes through discussion and review of the primary data. Data were coded using this template, which was modified several times during the analysis to adequately describe the findings. Researchers engaged in extensive discussion to draw higher-order interpretations about the most significant findings and likely mediating factors.

3.3. Participants

From the program’s inception in 2007, 21 students (3–4 students per class) entered the Women’s Reproductive Health SC. By 2012, three classes (10 students in total) completed the program. One student withdrew from the concentration after 1 year. Our analysis includes interviews from the first two classes of graduates ($n=7$) and their faculty mentors ($n=6$). Publications and presentations, written feedback, and portfolios from all three graduating classes were included in the analysis.

4. Results

4.1. Educational impact

Table 1 shows the program’s educational impact based on student reports organized by Kirkpatrick’s

Table 1
Impact of women’s reproductive health concentration on educational outcomes

Level of impact	Result	Illustrative quotes
A. Satisfaction	Very high satisfaction rates	“My expectations were exceeded exponentially...all in all, it was a fantastic experience.”
B. Career interests and perceptions	Values clarification	“[Participating in the concentration] helped me refine some thoughts on the type of doctor I wanted to be.” “This concentration helped me get to a place where I defined my medical values.”
	Academic career interest	“I really didn’t even know what academic medicine was before and I am definitely very interested in that now.” “The concentration has created a supportive environment in which to test out my vision of a well-rounded career that includes a patient-centered clinical practice as well as an academic life with opportunities for scholarship and leadership.”
	Commitment to reproductive health	“The concentration cultivated my passion for family planning and reproductive choice issues.”
	Advocacy and work with underserved	“I feel empowered to continue working with ‘hard to reach’ populations and studying barriers to care.” “The lessons and knowledge gained from my involvement with the concentration...have become...my personal motivation for confronting and overcoming the social barriers in place that prevent equitable care for women.”
C. Knowledge and skill development	Reproductive health knowledge and skills Research skills	“greater awareness of reproductive health issues” “strong foundation for me to build my research and publication skills, but also to operate independently and experiment on my own.” “having had a very successful experience with research...makes me feel like I can do valuable research even with limited time.”
D. Scholarly work ($n=10$ graduates)	24 peer-reviewed conference presentations 9 peer-reviewed publications	
E. Clinical specialty/career	Variable effects — for most, no reported effect on residency choice	

model of educational outcomes. The lowest level impact, satisfaction, was uniformly positive, and all students and mentors reported enthusiastically that they would participate again.

In terms of effects on career interests and perceptions, students noted that participating in the concentration helped clarify their professional values and nurtured their interests in reproductive health care, academic medicine and advocacy for underserved patient populations. Several mentors noted the role they played in helping students determine their residency training field.

In terms of learning, students reported strengthening of knowledge in reproductive health as well as enhanced research skills. Behavioral outcomes among the 10 graduates of the program included 9 peer-reviewed publications (range 0–2, median 1, 6 of 10 students published) and 24 national conference presentations (range 0–5, median 2, 9 of 10 completed). The student concentrator was first author in eight of the nine publications. All students except one completed at least one national presentation or peer-reviewed publication. Three students published their position papers (in addition to a national presentation or another publication). One student received credit for dissemination of her project through her involvement in state legislation (writing, testifying and public education). Most students became involved in several reproductive health projects through connections with mentors.

Of the graduates interviewed, four entered obstetrics/gynecology and one each entered family medicine, surgery and pediatrics. Most students reported little effect of the concentration on their specialty choice, but they expressed plans to remain involved in reproductive health in their chosen field and viewed their experience as beneficial.

4.2. *Mentor perspectives*

Mentors unanimously praised this group of students for their high levels of motivation and commitment to their work. Being a mentor in the concentration generally benefited them through synergy with or increased productivity in their own academic work, as well as personal enjoyment of working with the student.

4.3. *Challenges*

Interviewees identified few major challenges in their work. Good access to enthusiastic mentors was identified as critical. Mentors' busy schedules at times made it difficult to arrange meetings, and two students had a mentor move to another institution, limiting ongoing support for their project or publication.

4.4. *Factors mediating program impact*

Three key factors emerged to explain the identified benefits of the program.

4.4.1. *Longitudinal mentoring*

First, the student's relationship with his/her project mentor had a major positive influence, by providing support and motivation and in many cases serving as a role model and advisor for the student's career choices. A student described her faculty mentor as an "inspiring role model, as she is able to balance clinical, research and family responsibilities." According to another student, "[my relationship with my mentor] totally changed my entire life... it put me where I am now and helped me establish the specialty I wanted to go into and the career path I wanted to choose."

4.4.2. *Community of peers and faculty*

Second, the relationship with the student/faculty group established through the monthly women's reproductive health seminar series played a key role in nurturing and sustaining students' passion for reproductive health. The group meetings provided a platform for discussion, feedback on project design and writing, a source of motivation and network of support in achieving their project goals, and an opportunity for collaborative learning about clinical reproductive health topics. One student described the seminars as "a place to voice my ideas, share my frustrations and brainstorm with my peers about ways to overcome the problems I was facing," while another noted that "frequent contact with others who share my passion for reproductive health has been energizing and reaffirming." Furthermore, after presenting at national conferences, several students noted that they now felt connected to a larger network of reproductive health professionals.

4.4.3. *Student independence*

Finally, the freedom and independence students have to design and carry out their concentration projects emerged as an essential feature of the program's success. Students valued the "freedom to pursue a wide range of interests and activities," the ability to take risks, and ownership of a project. As one student noted, "the concentration has given me an opportunity to study a topic that may never have been examined before, and a topic that has potential to paint the rest of my career."

5. Discussion

The Scholarly Concentration in Women's Reproductive Health offers a combination of longitudinal mentoring, a peer group that fosters learning, support and motivation, and student independence in project work that facilitates changes in knowledge, skills and attitudes as well as an impressive record of publication among this group of students. Nurturing students who are interested in this area and preparing them with skills to succeed in academic medicine should produce academic faculty who could improve education and advance clinical science in reproductive health.

Several researchers have proposed theoretical models that explain how SCs may produce results such as those we

observed. First, structured experiences provided by an SC may promote “professional identity formation,” a transformative process of integrating personal and professional values that occurs during the course of training [13]. This process involves cycles of experience and reflection and growth in knowledge of oneself and one’s field; the longitudinal mentoring and support from peers and faculty in the seminar series facilitates this process among our students. Longitudinal mentoring may be particularly important in supporting students who are interested in reproductive health, especially in areas such as family planning, unintended pregnancy, and abortion, which are often addressed in a limited way if not avoided entirely in traditional medical curricula.

Professional formation is greatly shaped by its social context [14]. In the interactive seminars and group review of one another’s work, students share ideas and experiences, and the community provides a social context for learning, finding meaning and constructing one’s professional identity. The monthly seminars allowed the formation of what Wenger describes as a “community of practice,” which consists of a group of people with a shared domain of interest who engage in a collective learning process, supporting one another’s professional growth and learning [15].

Finally, Lent and colleagues’ [16] social cognitive theory of career development asserts that positive learning experiences increase learner self-efficacy and shape career interests. Mentors and students alike expressed great enthusiasm about their experiences working together, and we observed the development of our students’ career interests toward an academic focus and sustained interest in reproductive health research, education and advocacy.

As mentioned above, long-term data on how SC participation affects career choice are lacking. Chongsiriwatana and colleagues [17] reported an increased proportion of students entering OB/Gyn and family medicine residency among those who participated in women’s health research at one medical school (compared to those who conducted research in another area). However, our participants, the majority of whom also matched in these two specialties, chose the women’s reproductive health SC because they had prior interest in these areas. The concentrators entering other specialties such as surgery and pediatrics felt their knowledge and skills in reproductive health would be important strengths.

Some commitment of medical school resources is necessary for successful SC programs (see Green et al [7] for details). Each faculty SC director is compensated for 5% to 10% time, and a part-time medical school administrator oversees the 13 concentrations, coordinating student enrollment, selection for summer funding, program evaluations, educational sessions on literature searches and research poster design, and a research poster day. Summer stipends are provided for most students through the competitive funding process described above, and students may apply for \$750 per year to support conference travel to present their

work. Project mentors are not reimbursed for working with students and did not cite this as a concern.

5.1. Limitations and future research

Much of the data in this small study is from students’ self-report of their experiences. However, the interviews and textual data add depth to our understanding of how programs such as this one achieve their outcomes. The successful publication and presentation rate among our students is high, but the group is small and we do not have comparison data from nonconcentrators. The time course of this evaluation is short so we do not yet have information on later effects on career path and academic achievements among this group of students, whom we will be following to assess whether this model provides a successful pathway to leadership. We hope to replicate this program at other institutions to assess its impact on a larger group of students.

5.2. Conclusion

An SC emphasizing longitudinal mentoring relationships, a nurturing community of practice and independence in project work helped students develop research skills and nurtured values and interests that may promote academic careers in reproductive health. This model holds promise for producing future leaders in the field.

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